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IN-DEPTH COUNTRY STUDY IN THE REPUBLIC OF KOREA - STATUS, TRENDS AND PROSPECTS TO 2010

by

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INFORMATION NOTE ON ASIA-PACIFIC FORESTRY SECTOR OUTLOOK STUDY

At its sixteenth session held in Yangon, Myanmar, in January 1996, the Asia-Pacific Forestry Commission, which has membership open to all governments in the Asia-Pacific region, decided to carry out an outlook study for forestry with horizon year 2010. The study is being coordinated by FAO through its regional office in Bangkok and its Headquarters in Rome, but is being implemented in close partnership with governments, many of which have nominated national focal points.

The scope of the study is to look at the main external and sectoral developments in policies, programmes and institutions that will affect the forestry sector and to assess from this the likely direction of its evolution and to present its likely situation in 2010. The study involves assessment of current status but also of trends from the past and the main forces which are shaping those trends and then builds on this to explore future prospects.

Working papers have been contributed or commissioned on a wide range of topics. They fall under the following categories: country profiles, selected in-depth country or sub-regional studies and thematic studies. Working papers are prepared by individual authors or groups of authors on their own professional responsibility; therefore, the opinions expressed in them do not necessarily reflect the views of their employers, the governments of the Asia-Pacific Forestry Commission or of the Food and Agriculture Organization. In preparing the substantive report to be presented at the next session of the Asia-Pacific Forestry Commission early in 1998, material from these working papers will be an important element but will be blended and interpreted alongside a lot of other material.

Working papers are being produced and issued as they arrive. Some effort at uniformity of presentation is being attempted but the contents are only minimally edited for style or clarity. FAO welcomes from readers any information which they feel would be useful to the study on the subject of any of the working papers or on any other subject that has importance for the Asia-Pacific forestry sector. Such material can be mailed to the contacts given below from whom further copies of these working papers, as well as more information on the Asia-Pacific Forestry Sector Study, can be obtained:

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1. INTRODUCTION

1.1 The Korea Economy and Economic Policy

In the last three decades, the Republic of Korea has achieved what is widely acclaimed as " the economic miracle on the Han-gang River." Since Korea embarked on economic development in earnest in 1962, its economy has grown at one of the fastest paces in the world. The country has overcome a series of obstacles and challenges, transforming itself from a subsistence agrarian economy into one of the world's leading newly fast industrializing countries, an achievement all the more impressive considering the extent of devastation by the Korean War. Today, however, the Korean economy faces new challenges. Internally, it must deal with the inevitable turbulence accompanying political democratization and externally, it is confronted by an increasingly complex and tough international trading environment.

Since Korea launched its 1st Five-Year Economic Development Plan in 1962, the country's real GNP has grown by an average of more than 8% per year. The economic structure was radically transformed as a result of the successful development programmes implemented during these years. In around three decades, from 1962 to 1995, Korea's gross national product increased from 2.3 billion $ to 451.7 billion $, with per capita GNP soaring from 87 $ to about 10,076 $ at current price levels. The commodity trade volume reached more than 260.1 billion $ in 1995 in contrast to 477 million $ in 1962. The gross savings ratio rose to 36.2% of GDP from 11.0% during the same period.

Korea's development is even more remarkable in view of its situation until the early 1960s. Korea had been economically backward for most of its long history. There were few significant industries before liberation from Japan's 35-year colonial rule (1910-1945), during which Korea's economic resources were ruthlessly exploited by the Japanese. The Korean economy was further devastated during the Communist-provoked Korean War (1950-1953), the damage from which took a long time to heal. As late as 1961, Korea was still suffering from the many difficulties commonly faced by less developed nations. On top of its extreme poverty, the population was growing by 3% annually. Unemployment prevailed and savings were negligible. The nation had no notable exports, and it depended on imports for both raw materials and important manufactured goods.

Given the limited size of the domestic market, economic planners found it necessary to adopt an export-oriented industrialization strategy. This outward-development strategy was practically well suited to Korea's conditions in the early 1960s. Government initiatives played an important part in development efforts. A more realistic single exchange rate was adopted and short-term export financing was made available. Customs procedures were simplified, enabling exporters to easily import necessary raw materials. Foreign investment was also strongly encouraged.

Several factors are usually cited to explain Korea's remarkable economic development. One is the Government's role in directing the economy. In its Five Year Economic Development Plans, the Government would direct businesses to focus on specific key industries by providing generous incentives in the form of tax breaks, subsides, low interest loans, and manpower training, as well as others. Another interrelated factor was the

export-oriented economic strategy, deemed appropriate since Korea lacked natural resources. A third important factor was the abundant availability of cheap, yet highly educated and disciplined labour. The traditional respect for learning combined with the rapid modernization of the Korean education system led to Korea having one of the highest literacy rates in the world. These factors combined with a favourable international economic climate to work what is commonly called the "the economic miracle on the Han-gang River".

Table 1. The key socio-economic indicators in Korea

Year	1955	1960	1970	1980	1990	1995
GNP (billion $, current)	1.4	1.9	8.1	60.6	251.8	451.7
Per capita GNP ($)	65	79	253	1,597	5,883	10,076
GNP growth rate (%)	4.5	1.1	7.6	-3.9	9.6	8.7
Industrial structure (%)						
Agri. Forestry & Fisheries	44.5	36.8	26.6	14.7	8.7	7.0
Manufacturing	12.6	15.9	22.5	29.7	29.7	27.2
Services	42.9	47.3	50.9	55.6	27.2	66.2
Population (1,000 people)	-	25,012	32,241	38,124	42,869	44,851
Annual pop. increase rate (%)	-	-	2.2	1.6	1.2	0.9
Population density (per km^2)	-	-	-	385	432	451

Source: Korea National Bank

During the late 1980s and early 1990s, though, the Korean economy began experiencing slower growth, higher inflation and a deterioration in the balance of payments. This setback was the result of a structural deterioration in competitiveness caused by the growing inefficiency of the government-guided economic system and the disappearance of the once ample supply of low cost, skilled labour, not to mention the increasingly hostile international economic environment.

In 1993, Korea government declared the revitalization of the economy as one of its foremost tasks, and set about to develop a new economic paradigm called the "New Economy" as part of its master plan of creating a "New Korea". Government has also tried to diversify its trade ties. While the Republic has steadfastly tried to strengthen its trade relations with traditional partners such as the U.S. and Japan, the nation has also made great efforts to expand its trade and capital cooperation with the Southeast Asian nations, the former and present socialist countries and Third World nations as well. The Republic has also tried to take a more assertive role in international forums.

In light of the rapidly changing international economic sense, these enlightened policies, in combination with the Republic's growing environmental awareness, will help realize the envisioned "New Economy". It is predicted that Korea could join the ranks of the advanced nations by entering the Organization for Economic Cooperation and Development (OECD) in December of 1996.

1.2 Political Situation in Korea

Korea has a democratic form of government based on the separation of powers and a system of checks and balances. The Constitution was first adopted in 1948 when the Republic of Korea was established and has been revised nine times as the country struggled to make democracy work effectively. It guaranteed the basic rights and freedoms of the people, including, but not limited to equality before the law, freedom from arbitrary arrest, freedoms of residence, the right to vote and hold public office, the right to privacy and freedom of region, speech, the press and assembly, as well as the right to a clean environment and to seek happiness. It also provides for various economic rights, - as well as the duty - to work, freedom of choice of occupation and the right to collective bargaining to obtain optimum wages and fair compensation.

Because of the recent revision of constitution, the direct election of the President is changed to a single five-year term and also local autonomy system was established for the first time in 30 years. These two provisions are key to the strengthening of democratic institutions in Korea. The revision also reinstated the right of the National Assembly to inspect all aspects of state affairs on a regular basis, as a check on the power of the executive. Finally, it charges the Government to seek to reunify the nation. In 1997, Korean will elect the new President.

The Government consists of three branches: the legislature, in the form of a unicameral National Assembly; the judiciary, consisting of district and appellate courts and a supreme court; and the executive, headed by the President who is the head of state and commander-in-chief of the Armed Forces. The President is assisted by the Prime Minister and the State Council.

1.3 Social and Human Context for Forestry

After the second World War, Korea was well known as the divided country, which is the product of a Cold War, and one of the poor countries in the world up to 1950s, and also as one of the successfully reforested countries as well as one of the developing countries in 1980s.

Korea, located in Far East Asia, has a temperate climate characterized by summer monsoons and by continental winters with freezing weather. Seasonal changes are gradual but distinctive; spring and autumn are relatively short while summer and winter are rather long. The annual mean temperature extends from 3 to 16 and the annual precipitation ranges from 600 to 1,600 millimetres. Due to its diverse distribution of climatic conditions, Korea exhibits various types of forests, which is divided into sub-tropical, warm-temperate and cool-temperate forest zones. The sub-tropical zone consisted of evergreen hardwood forests in southern part of Korean Peninsular and island, and forest of warm-temperate zone were made of mostly deciduous hardwood species.

Since early 1960s, organized investments have been made in the forestry sector as a part of national economic development plan. In addition, tree planting and forest protection practices of the New Villages Movement (Saemaul Undong) played a major role in rehabilitation of forest land. However, forests are still in premature stage under 30 years old, and they still have very limited economic importance.

Even though the forest is premature in Korea, the forest is important as the living environment for Korean. Five thousand years of established myths of country and culture are based on the mountain and forest. If the history of western countries is related with the stone and desert, then that of Korea is the wood and forest. Therefore if we consider the fact that Korea is a mountainous country, and mountain means the forest, the mountain and forest in Korea are the life of Korea itself. For example, a lot of Koreans have firmly believed that a lot of honourable people born in the noted mountains, and if they establish a ce metrey in good place in mountain according to the theory of configuration of the ground, their descendants will be successful in future.

Table 2. Trend of land use pattern in Korea (Unit: 1,000 ha)

Classification	1970	1975	1980	1985	1990	1995
Total national land	9,848	9,880	9,899	9,922	9,927	9,927
	(100.0%)	(100.0%)	(100.0%)	(100.0%)	(100.0%)	(100.0%)
Forest land	6,611	6,635	6,568	6,531	6,476	6,452
	(67.1%)	(67.2%)	(66.4%)	(65.8%)	(65.2%)	(64.9%)
Cultivated land	2,298	2,240	2,196	2,144	2,109	1,985
	(23.3%)	(22.7%)	(22.2%)	(21.6%)	(21.2%)	(20.5%)
Other land	939	1,005	1,136	1,239	1,342	1,490

Source: Forestry Administration
Note: Number may not add to total due to remainder

2. THE FOREST RESOURCE IN KOREA

2.1 Forest Area and Volume

Before the 20th century, the major part of forest in Korea was owned by country and some was occupied by village community and individual. However forest ownership was classified as the national, public and private forest according to the forest survey to exploit Korean forest resources by Japan after 1910.

In early the 20th Century, the Japanese harvested the total volume of about 500 million cubic metres in Korean Peninsula, and in 1945 the average volume per ha in Korea dropped to 14 cubic metres from 45 cubic metres in 1910.

Table 3. The change of forest area and volume in Korea by period

Classification	Unit	1910	1945	1960	1990	1995
Area	mil. ha	15.7	16.3	6.7	6.5	6.5
Volume	mil. m^3	710	219	63.9	248	309
Vol. per ha	m^3	45	14	10	38	47

Source: Forestry Administration
Note: Data before 1945 is the data of the Korean Peninsula.

In Korea, as of 1995, forest land is about 6.5 million ha, representing 65% of the total land area. However, the forest land per capita is very low at 0.15 ha, only 20% of world average. Among the forest land, about 70% is under normal forest management. The other

30% of forest land has been designated for special purposes such as urban planning areas, military reserve areas, and cultural resources protection areas, which restricts normal forest management practices.

The total stock volume is 309 million cubic metres and the average stock volume per ha is estimated to be 47 cubic metres in 1995. Compared to ther countries, these stock volume seems pretty poor. However this figure is much higher than 10 cubic metres in 1960s when much of the forests was degraded and destroyed. Now we can no longer see the bare mountains throughout country due to the massive reforestation. The annual growth rate is estimated at 4.9%.

Now forest lands are classified into national, public and private forest by ownership and are also divided into reserve (for production and public welfare) and semi-reserve (for industrial) forests by utilization.

National forest, which are 21% (1,382 million ha) of the total forest land, are mostly managed by 24 National Forest Stations. The national forest can be subdivided into permanent and disposable forests. Most of national forests are permanent forests and they are usually managed for timber production, land conservation, scientific research, development of forestry techniques, preservation of both historical relics and tangible cultural heritage, and other public benefits. Disposable national forest may be converted to other uses. At the end of 1993, the average stock volume of the national forest was 68 cubic metres per ha, which was greater than the national average, 43 cubic metres per ha. Public forest owned by local governments comprise about 8% (0.491 million ha) of the total forest land. Public forests contain only 7% of the total stock volume and their average stock volume per ha is low compares to the national forests.

If we consider the fact that the ratio of the public ownership of forest land averages over 70% in the world, then the 29% of national and public forest is not sufficient to accomplish the national forestry policy in Korea. Besides the barrier of small area, most are located in the top area of mountain and are also scattered in a lot of small pieces.

To efficiently manage the national forest, Forestry Administration has enhanced its capabilities in various ways; first, enlargement and grouping of the national forest lands; second, improvement of the public functions of forests; and third, improvement of basic forest management infrastructure. The area of national forests has been slowly increased by the National Forest Extension Policy initiated by the Forest Administration. This Policy is in progress now, and the long-term goal is to increase the size of national forests up to 40% of total forest land in Korea. Also, it is expected to develop the public forest actively in some provinces according to the local self-government system started from 1995 in Korea.

Private forest occupy 71% (4,586 million ha) of the total forest lands. They are owned by private individual and organizations such as people's parties, families, and cooperative groups. The number of private forest owners is about 2 million. But 96% of the owners own less than 10 ha of forest to a total forest area of about 52.5%, so the ownership scale is very small; this trend is accelerating. The main purposes of private forests are for the burial places and the propagation of property.

Table 4. Status of private forest ownership in Korea (1993)

Forest size (ha)	No. of owner	%	Forest area (ha)	%
- 0.5	940,613	48.1	143,495	3.1
0.5 - 1	253,795	13.0	186,068	4.0
1 - 5	561,184	28.7	1,307,687	27.9
5 - 10	118,787	6.1	823,671	17.5
10 - 20	51,719	2.6	707,200	15.1
20 - 50	21,601	1.1	632,700	13,5
50 - 100	4,435	0.2	300,859	6.4
100 +	2,229	0.2	589,266	12.5
Total	1,954,363	100.0	4,690,946	100.0

Source: Ministry of Home Affair

2.2 Forest Species

The most represented forest in Korea is the coniferous forest. Coniferous forests account for 45.9% of the total forest, while deciduous, mixed and other forests constitute 26.6%, 27.3% and 3.0% respectively in 1995. The major tree species of Korean forest are red pine, Korean white pine, larch and oak species.

By the 1960s, forest lands in the Republic of Korea were severely depleted as a result of population pressure, fuel wood demand and the Korean War. In 1961, the unstocked forest land accounted for 41% of the total forest land area. Between 1961 and 1995, stocked forest land increased from 4 million hectares to 6.3 million hectares, as a result of a large-scale reforestation programme.

Table 5. Forest land area by forest type (Unit: 1,000 ha)

Forest Type	1967	1970	1975	1981	1985	1990	1995
TOTAL	6,639	6,611	6,635	6,563	6,531	6,476	6,452
Stocked forest	5,650	5,693	5,976	6,287	6,263	6,278	6,263
Coniferous	2,946	3,268	3,201	3,256	3,281	3,079	2,876
Non-Coniferous	1,238	1,206	1,099	1,150	1,159	1,389	1,668
Mixed	1,226	1,219	1,676	1,881	1,823	1,810	1,710
Non-stocked forest	942	854	647	246	244	174	188
Bamboo	4	7	5	5	5	8	8
Unsurveyed	43	52	8	25	19	16	0

Source: Forestry Administration, Republic of Korea.
Note: Number may not add to total due to rounding
Note: Forestry Administration established in 1967, and published the 1st Statistical Yearbook of Forestry. Forestry Administration didn't publish the Statistical Yearbook in 1981, so there is no data for 1980.

Up to now, Korea has reforested the 3.97 million ha of forest, and planted 10,864 million seedlings of which conifers are 2.59 million ha, fast growing trees are 0.94 million ha and nut bearing trees approximately 0.42 million ha. Of the conifers, Japanese Larch (*Larix leptolepis (S. et Z) Gordon*) is 0.67 million ha, Pitch pine (*Pinus rigida Mill.*) is 0.54 million ha, Korean pine (*Pinus koraiensis S. et Z.*) is 0.35 million ha, Hinoki (*Chamaecyparis obtusa (S. et Z.) End*l) is 0.12 million ha. In the fast growing trees, Italian poplar (*Populus euramericana Guinier*) is 0.67 million ha, Suwon hybrid poplar (*Populus*

tomentiglandulosa T. Lee) is 0.18 million ha. In the nut bearing trees, Chestnut (*Castanea crenata S. et Z.*) is planted in 0.26 million ha.

Table 6. Reforestation by National Forest Development Plan

Classification	Total reforestation Area	No. of seedling	Remarks
	thou. ha	mill. seedling	
Total	**3,974**	**10,864**	
62-72	1,649	4,617	For erosion control & fuelwood estb.
73-78 (1st Forest Plan)	1,080	2,960	For fast growing tree plantation
79-87 (2nd Forest Plan)	966	1,915	For commercial reforestation
88-94 (3rd Forest Plan)	278	719	For natural forest management

Source: Forestry Administration

Especially important was the establishment of fuelwood forests, of which 1 million ha were accomplished through the aid of IBRD projects in 1970s. Black locust (*Robinia pseudoaccacia L.*) was planted one of species for the fuelwood forest. Recently because of the rapid economic development, the fuelwood is less needed and the purpose of Black locust plantations has changed to timber production and beekeeping industry based on the flower of Black locust (this is one of the most promising businesses to increase the income of forest owners).

It was possible to accomplish the massive planting project in short period by the participation of forest owners, village residents and the government and other public organization. Such large scale project based on the participation of the village residents is a rare case in the world. In Korea, it is possible because of the village community called "Sanrimgae", which is organized for forest protection from several hundred years ago.

Also government provides a financial support about 35 - 87% of planting expenses for slow-growing conifer and 32 - 43% for fast-growing tree species up to now. The loan period of financing for plantation projects is for 35 years (repayment in 15 years after a 20-year grace period) in slow-growing species and 15 years (repayment in 5 years after a 10-year grace period) in fast-growing species planting. Currently IRR of conifer has dropped to 3%, so government is trying to provide 100% of expenses by financing. Several additional benefits are also offered to forest owner who planted trees by providing reductions of income tax and exemptions of inheritance tax. Also various technical assistance and extension services are available to forest land owners.

However, after reforestation, forest owner have harvested the fuelwood forest and fast growing tree like Acasia and Alnus, and changed forest lands into other purposes to increase the benefit of land use. Because of these reason and silviculture failure, the remaining reforestation area is about 2.50 million ha of which the reforested areas in mountain zones is 2.04 million ha, and so the ratio of artificial reforestation is about 32%. However recently annual artificial reforestation area has been reduced because of policy change in favour of natural forest tending, and due to economic difficulties such as shortage of forest labour and slump of log prices. The artificial reforestation’s target of Government is for plantations to make up 50% of forests.

Table 7. Forest area and stock by age class

Year	Area (1,000 ha)						Stock (1,000,000 seedling)					
	Total	-10	-20	-30	-40	-50	Total	-10	-20	-30	-40	-50
1970	5,741	3,755	1,106	565	228	77	69	3	19	27	14	6
1980	6,287	3,134	2,151	553	325	123	152	5	71	28	32	15
1990	6,278	1,633	2,572	1,470	444	159	249	3	103	81	43	19
1995	6,255	1,093	2,513	1,999	469	181	309	-	106	128	51	24

Source: Forestry Administration

2.3 Forest Management

In the 19th century, Korea had comparatively rich old-growth forests in some regions. However, these forests were mostly destroyed by over-cutting and illegal harvest throughout the Colonial Period of 1910-1945 and Korean War of 1950-1953.

The Forest Law of 1961 required the Forestry Administration to set up the national forest plan every 10 years in order to establish and manage the forest resources efficiently. Local governments should set up local forest plans on the basis of the direction of the national forest plan.

2.3.1 The First 10 Year Forest Development Plan (1973-1978)

A turning point in Korean forestry was witnessed in 1973 with the initiation of the First 10 Year Forest Development Plan which targeted the reforestation of denuded forest lands as early as possible; 1 million ha was to be planted within 10 years under the following objectives: First, to implement the national tree planting movement through the participation of all people in various reforestation projects; second, to develop new economic zones of forest lands directly connecting the goals of land conservation and income enhancement by reforestation and forest production; thirds, to achieve rapid reforestation of denuded forest land through the planting of fast-growing tree species; and fourth, to accomplish the stabilization of shifting cultivation based on fire.

In particular, government has appointed the month of April as the 'National Tree Planting Period' for the best time to plant trees. The government also encouraged various groups such as villages, families, and schools to participate in the reforestation programme. In this period, remarkable progress was made in forest protection by minimizing artificial damage to forests by prohibiting the access to mountains and the formation of rural fuelwood forests.

Through the implementation of this movement, the First 10 Year Plan which was originally planned to be completed in 1982, accomplished with the reforestation of 1.08 million ha in 1978.

2.3.2 The Second 10 Year Forest Development Plan (1979-1987)

The basic objectives of the Second 10 Year Forest Development Plan were to build large scale commercial forest zones for production of industrial timber. For efficient

implementation of the plan, the government initiated various forest policies: the strengthening of the national reforestation plan, the expansion of forest protection activities, the enlargement of the forest development funds for supporting private forest management, grouping and enlarging the national forests, and the conducting of forest conservation projects for improving the public benefits of forests.

Especially financial and administrative support by the government were to encourage the reforestation activities and the cooperative management of small scale private forests.

The major accomplishments in this period were first, the reforestation of 966 thousand ha with the formation of 80 large scale group commercial forest zones (325 thousand ha). Continuous management of natural forests and juvenile artificial plantations was also carried out. Erosion control works were undertaken in accordance with the principle of regional completion on denuded of forest areas.

Second, helicopter purchasing project started to implement the forest fire prevention and aerial control of diseases by government. Scientific prevention of forest diseases and insect damages was also undertaken using biological control methods. Nevertheless, the perfect prevention method against pine needle gall midge (*Thecodiplosis japonensis Uchida et Inoue)* which is a critical enemy of pine forests, has not yet been developed.

Third, the Forest Works Training Centre was established to raise the level of mechanization in forest activities and to train forest technicians. Also, forest road construction was regularized and 786 km of forest roads were constructed.

In this period, Forestry Administration propelled the forest project with FAO. Dr. Schreuder, Professor of University of Washington in USA, who participated in the FAO project on forest management in Korea, mentioned assessment of the commercial utilization potential of Korea's forest resource as follows: "Korea's forest resource is only partly composed of desirable species. Of those species with commercial potential, such as oak species and Red pine, stands are generally in poor condition and timber from these forests in next 10-20 years will be low grades and small dimensions. The major end use will be pulpwood. White pine is generally in good condition. It is very slow growing species, and has potential for both pulpwood and construction end uses. However, it only accounts 1% of the resource. Japanese larch, Pitch pine and poplar species, although planted extensively, are generally unsuitable for pulp manufacturing or construction end uses."

2.3.3 The Forest Resources Enhancement Plan (1988-1997)

After successful reforestation campaigns, the Forestry Administration was transferred from the Ministry of Home Affairs to the Ministry of Agriculture and Fishery as a means of strengthening forest resource establishment policies in 1988. At the same time, the 3rd 10 Year Plan based on the experience of the 1st and 2nd plans was launched.

The objective of the Forest Resources Enhancement Plan (The 3rd National Forest Plan) is to harmonize the goals of increasing the economic development of forests and improving public benefits from the forests. Although reforestation was nearly completed by the 1st and the 2nd 10 year Forest Development Plan, Korea still depends for more than 85%

of domestic timber use on imported timber. At the same time, there is also an increasing demand for the conservation of the environment and outdoor recreation in forests. The fundamental object of the 3rd Forestry Development Plan is the improvement of Korea's roundwood self sufficiency to a target of 51% self sufficiency by 2030.

The fundamental targets of the plan are based on maximizing the efficiency of forest land utilization, building a foundation for forest land management, creating forest income sources in rural areas and improving the multiple public benefits of the forests. Under these objectives, the government has established the following priorities.

First, forestry development promotion zones of about 1.52 million ha have been designated in private forests on which government investments will be concentrated. Simultaneously the management system should be modernized through the mechanization of forest works and the designation of adequate management units in national and public forests.

Second, the new concept of multiple use management is introduced, and this new idea promotes harmonious relationships between timber production and the other functions of the forest.

Third, the government plans to enlarge urban forests in city areas and recreation forests in rural areas to provide people clean air, water, and rest spaces.

Additionally the government plans to increase the efficiency of forest activities by improving forest road infrastructure, amend forest laws and forest taxation system, raise forest development funds to implement private forest cooperative management, and finally operate research projects in various fields.

The timber demand for domestic use will continuously increase because of population increase and economic development; however, the growth rate of timber consumption will be reduced in the 2000s. It is inevitable to continue mostly depending on foreign timber resources in the future but in order to establish a stable long-term timber supply, the government needs to increase domestic timber resources and to diversify through forest development investments abroad. In 1993, domestic timber supply was 1.184 million cubic metres, representing 13% rate of self-sufficiency, and the rate of log self-sufficiency is projected to reach 19% in 2000.

The long term forecast for timber demand and supply was established by government to promote stable development of timber industry. In 1993, Forestry Administration and Korea Rural Economic Institute (K.R.E.I.) forecast the forest resources and wood industry to promote stable development of timber industry and sustainable forest management. Because of the difference of assumptions which the two agencies used, the figure forecast are different in future. They predict the long term estimation up to 2010. The forest area will decrease about 70-100 thousand ha, but the volume will increase nearly 100% compared to base year (1992), and average volume per ha will be about 82-89 cubic metres.

There is no big change in the foreign log import in future, and it is expected to increase the domestic log supply up to 2,542 thousand cubic metres in 2000, and to 4,787 thousand cubic metres in 2010. The total "timber" (which includes all wood products combined like the chips and pulp), consumption will increase up to 38% compared to base year (1992). The total

timber demand will increase to the 30,735 thousand cubic metres in 2010 and 38,799 thousand cubic metres in 2040. The timber demand of 2040 is nearly 2 times compared to 1992 because of increased population and annual income. The annual timber consumption per capita will be 0.75 cubic metres in 2040 from 0.51 cubic metres in 1992. The domestic roundwood supply will be 13,799 thousand cubic metre in 2040, and overall sufficiency will also increase to 35.6% (for log 59%) from 5% (for log 12%).

Table 8. The scenario of forest resource change

Forecasting			1992	2000	2010	2020	2030	2040
F.A.	Area	1,000 ha	6,464	6,410	6,363	6,335	6,327	6,327
	Volume	mill. m^3	272	413	563	686	781	854
	Vol. per ha	m^3	42	64	89	108	123	135
K.R.E.I.	Area	1,000 ha	6,464	6,430	6,394	6360	6,332	6,307
	Volume	mill. m^3	272	405	524	642	714	830
	Vol. per ha	m^3	42	63	82	101	113	132

Source: Forestry Administration, K.R.E.I.
Note: The figure of forecasting is based on 1992

Table 9. The scenario of demand and supply for timber

Classification	Unit	1992	2000	2010	2020	2030	2040
Demand	1,000 m^3	22,275	26,421	30,735	34,563	37,394	38,799
Supply	1,000 m^3	22,275	26,421	30,735	34,563	37,394	38,799
Domestic	1,000 m^3	1,123	2,542	4,787	7,530	10,852	13,799
Import	1,000 m^3	21,152	23,879	25,948	27,033	26,542	25,000
Self-sufficiency	%	5	9.6	15.6	21.8	29.0	35.6

Source: Forestry Administration
Note: Figure of forecasting is based on 1992

A lot of the imported log will be sustainably provided by Korean companies overseas plantation. The share of logs from the overseas plantations of Korean companies will be more than 50% of total imported log amount.

3. FOREST INDUSTRIES IN KOREA

Timber products industries had been one of the main exporting industries in Korea, and plywood and sawnwood industries led exports from the late of 1960s to the early of 1980s. At the same time, they played a leading role in national economic development by offering stable supply of construction and housing materials. From the 1980s, Korean timber industries have suffered from declining competitiveness both domestically and abroad which resulted from restriction of log exports by tropical countries, increased prices of imported logs and of domestic labour cost, and development of substitutes for timber.

To protect and develop the timber industries, the government is reviewing various countermeasures: development of the techniques for improving international competitiveness, improvement of quality, financial support of factory automation facilities, and assistance of the stable supply of raw materials.

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3.1 Forestry and Logging

Even though the forest area occupies 65% of the whole land, the productivity of forest in Korea is very low because of the high share of the young premature stands but also especially due to the low harvest volume limits set by Government; the whole cutting volume permitted is usually about 11% of annual increasement.

Table 10. Trend of forest resources and harvest volume (Unit: 1,000 m^3)

Year	Growing volume (A)	Harvesting volume (B)	Ratio (B/A) (%)
1980	5,855	1,244	21
1982	6,608	1,205	18
1984	7,434	1,029	14
1986	7,870	1,105	14
1988	7,610	1,194	7
1990	8,871	1,077	12
1992	11,442	796	7
1994	13,020	896	7
Average	9,839	1,068	11

Source: Forestry Administration

Table 11. Permit of annual tree cutting by Forestry Administration

Classification		Unit	1980	1985	1990	1995
Total	Area	1,000 ha	100	85	72	56
	Volume	1,000 m^3	1,244	1,067	1,077	887
Final cutting	Area	1,000 ha	-	59	12	5
	Volume	1,000 m^3	-	931	309	176
Thinning area	Area	1,000 ha	-	26	29	30
volume	Volume	1,000 m^3	-	135	191	205
Regeneration cutting	Area	1,000 ha	-	-	9	6
of inferior stand	Volume	1,000 m^3	-	-	137	124
Other	Area	1,000 ha	-	-	22	15
	Volume	1,000 m^3	-	-	439	382

Source: Forestry Administration

Of the annual harvesting volume, the final cutting contributes 20-30%, and the inferior and pest and insect damaged tree cutting is more than 50%. Additionally the quality of cutting timber is also inferior. The harvesting cost in Korea is increased because of high labour and the transportation cost. Meanwhile, the log price in forest has continuously dropped, and this is the main cause of difficulties of forest management. The log price in forest stands is about 20% of market timber price in Korea.

The cutting area is also reduced. In 1995, the total cutting area was 56 thousand ha, and of this, the final cutting area was only 4,738 ha, and the thinning area 29,978 ha. This is because of the premature forests in young stages.

3.2 Logs

Production

Annual domestic log production remains around 1 million cubic metres. Currently domestic timber is mainly low-grade and small-dia metres softwood which is generally unsuitable for sawn timber production. The majority of domestic timber is used for pitprops and pulpwood. The share of domestic log production is around 15% of Korea's log consumption, and it's production capacity in Korea is very limited because of young and premature forest stand in near future.

Consumption

In 1965, the log consumption in Korea is only 1.3 million cubic metres, of which domestic supply is 0.5 million cubic metres, and the import supply is 0.75 million cubic metres. However from the late of 1960s, the plywood industry developed and consumed a lot of tropical hardwood log imported from Asian countries.

In the 1970's, Korea was one of the largest plywood producers in the world and its forest products market was dominated by imports of tropical hardwood logs which were manufactured into plywood. During the 1970s, more than 70% of imported logs were used for plywood production, and more than 70% of plywood produced in Korea was also exported

annually. In 1970s, the export demand share of log in Korea is about 60% in total demand. But the plywood industry faced with the management difficulty in 1980s, and log consumption for plywood declined slowly.

However the total log consumption has increased annually due to higher domestic log demand for the general purpose logs. In 1995, the total log consumption in Korea was about 9,284 thousand cubic metres of which the logs for domestic use was nearly 96%. In 1995, the plywood industry processed 18% of the Korea's total log consumption and plywood exports accounted for only 11% of total plywood production. The share of plywood for export was 4% of the total plywood production in Korea, and the 96% was used for domestic use in 1995.

The total log consumption declined in the early 1980s. During this period, there was significant rationalization of both the plywood and sawmilling industries in Korea.

Table 12. Trend of log demand and supply (Unit: 1,000 m^3)

Year	Demand			Supply		
	Total	Domestic	Export	Total	Domestic	Import
1965	1,259	748	511	1,259	503	756
1970	4,000	1,713	2,287	4,000	845	3,155
1975	6,465	2,889	3,576	6,465	896	5,119
1980	7,750	5,785	1,965	7,750	1,008	6,141
1985	7,321	6,792	529	7,321	1,188	5,578
1990	9,423	9,121	302	9,423	1,138	8,285
1995	9,284	8,939	345	9,284	1,055	8,229

Source: Forestry Administration

Imports

Imports dominate log supply in Korea: in 1975, about 70% of imported logs were processed into plywood, and the remainder were used for general use such as sawn timber and other use. Recently the share of plywood log in total imported logs is only 20%, and the share of general use log has increased to 80% in 1995 from 30% in 1975. Because of the difficulty and high price of tropical hardwood species, only 397 thousand cubic metres of Lauan was imported in 1995; this is 1/3 of the amount of peak time in 1980s. The imported value of Lauan is also only $20 million.

Table 13. Timber import by type of log

Classification		Unit	1975	1980	1985	1990	1995
Total	Quantity	1,000 m^3	5,119	6,141	5,578	8,285	8,229
	Value	mill.$	269	858	479	990	1,047
Plywood log	Quantity	1,000 m^3	3,576	3,328	2,028	2,321	1,683
	Value	mill.$	179	474	172	274	261
General use log	Quantity	1,000 m^3	1,543	2,813	3,550	5,964	6,546
	Value	mill.$	90	384	307	716	786
Lauan	Quantity	1,000 m^3	913	986	1,133	1,086	397
	Value	mill.$	49	180	102	137	20
Others	Quantity	1,000 m^3	630	1,827	2,417	4,878	6,149
	Value	mill.$	41	204	205	579	766

Source: Forestry Administration
Note: Figure of plywood log are estimated from plywood production

The major country of origin for log imports used to be the Philippines in the 1960s, and changed to Malaysia and Indonesia in 1970s. After 1980, it is changed to Malaysia and Papua New Guinea. From 1970s to 1990s, the majority of softwood is imported from USA. However from early 1990s, recently imports from New Zealand increased. The share of conifers in total log import has increased very rapidly and it is expected to continue in future.

In 1995, Korea imported the log from PNG (997 thousand, $155 million), Malaysia (656 thousand, $134 million) for tropical timber, and New Zealand (3.00 mil., $296 million), Chile (1.538 million, $158 million), USA (803 thousand, $179 million) for conifer.

Table 14. Trend of Korea log imports by source (Unit: 1,000 m^3 - 1,000$)

Species		1960	1970	1975	1980	1985	1990	1995
Hardwood	Quantity	712	2,852	4,661	4,486	3,228	3,483	1,656
	Value	24	113	236	661	281	418	289
Philippines	Quantity	222	888	264	82	67	-	-
Malaysia	Value	48	1,487	1,628	2,474	2,308	2,912	656
PNG	Quantity	-	-	-	133	841	571	997
Indonesia	Quantity	-	477	2,769	1,817	12	-	3
Others*	Quantity	44	303	458	1,655	2,350	4,550	6,573
	Quantity	2	13	33	198	198	543	758
USA	Quantity	18	236	448	1,043	1,494	2,971	803
New Zealand	Value	20	56	-	185	99	1,290	3,003
Others**	Quantity	6	11	10	427	757	541	2,769
Total	Quantity	756	3,155	5,119	6,141	5,778	8,285	8,229
	Value	26	125	269	858	479	990	1,047

Source: Custom Tax Administration
Note: Others* is mainly softwood, and Others** is hardwood from other country except Philippines, Malaysia, PNG and Indonesia and softwood from other countries except USA, N.Z.

The forecasting for log demand in 2010 in Korea is estimated to about 19.5 million cubic metres, and among them domestic supply will be 3.1 million cubic metres, and its share of total supply also increased to about 15.9% from 12.0% in 1990.

Therefore up to 2010, Korea should import the around 16 million cubic metres from overseas, and mainly will be imported for the domestic demand in Korea. The major log import sources will be New Zealand, Chile, USA and tropical countries. The softwood import will be increased, and the hardwood may continue the current trend or decrease the import amount in future.

Table 15. The scenario of demand and supply for log in Korea (Unit: 1,000 m^3)

Classification	2000	2010	2020	2030	Assumption
Demand	15,257	19,499	24,361	29,178	annual log price
Domestic supply	1,550	3,105	5,339	8,842	increase is 0.07%
Sufficiency ratio (%)	10.2	15.9	21.9	30.3	
Log import	13,707	16,394	19,022	20,336	
Economic growth ratio assumption (%)	6.90	4.27	4.00	3.50	

Source: Korea Rural Economic Institute

Exports

There is no log export from Korea up to now, and also no plan to export logs in the period before 2010.

3.3 Woodchips

Production and consumption

The total consumption of woodchips in Korea was 3,058 thousand cubic metres in 1995. The production of woodchips in Korea is mainly for pulp and board manufacture, and among the woodchips for pulp, most is for chemical pulp. In 1995, of the total of 1,039 cubic metres for pulp, 968 cubic metres was used for chemical pulp.

Imports

Imports of woodchips increased rapidly. They were 1,181 thousand cubic metres in 1995 (equal to about 656 thousand M/T).

Table 16. Trend of demand and supply of woodchips in Korea (Unit: 1,000m^3)

Classification		1991	1992	1993	1994	1995
Total Consumption		1,098	1,431	2,088	2,411	3,058
Demand in Domestic	for Pulp	427	435	879	1,002	1,039
	for Board	671	996	1,209	1,409	2,019
Import		169	385	963	1,134	1,181
		(94)	(214)	(535)	(630)	(656)

Source: Authors
Note: The unit of ( ) is 1,000 M/T.
Total Consumption minus import is the production amount of woodchip in Korea.

3.4 Sawn Timber

Production

The production of sawn timber in Korea was 1,148 thousand cubic metres in 1970, and the production increased every year. The production of sawn timber peaked at 5,949 thousand cubic metres in 1988, and consumed 8,842 thousand cubic metres of logs. In 1995, the consumption of logs for sawn timber was 4,737 thousand cubic metres, and the production of sawn timber was 3,440 thousand cubic metres. The 1995 production of sawn timber was only 58% of that in 1988.

The share of domestic logs for sawn timber dropped from 12% in 1980 to 6% in 1991, and slightly increased to 9% in 1995. However usually it stays around 10% of total sawn timber production. In domestic sawn timber, the share of softwood has increased. The species composition of imported logs which dominated log sawn timber production has changed: in 1985, tropical hardwood logs were 31.5% of total log imports, but this had dropped to 12% in 1995. Recently imported softwood logs from temperate zone countries have increased.

In 1995, the number of sawmills and employees were 1,402 and 12,592 respectively, much lower than in the past. However, the capacity utilization of sawmills increased from 38% in 1970 to 72% in 1995. Inchon, the entrance port of Seoul, is famous for the sawmills which use imported log. Inchon had the largest number of sawmills - in 1995, Inchon has 144 sawmills, and 3,051 employees, and its sawmill output was 31% of the Korean total.

However, the management of sawmills which use domestic logs as raw material is very inferior because of several reasons. Therefore it is difficult to find sawmill facilities for domestic timber even in the mountainous areas in Korea.

Table 17. Log consumption for sawn timber and production of sawn timber

Classification	Unit	1970	1975	1980	1985	1990	1994	1995
Production capacity	1,000 m^3	4,650	6,392	7,936	7,704	7,507	8,089	6,549
Log consumption	1,000 m^3	1,773	3,189	4,211	4,152	5,360	6,170	4,737
Imported logs		-	-	3,724	3,507	4,756	5,799	4,334
Softwood		-	-	-	2,201	3,466	4,505	3,826
Hardwood		-	-	-	1,306	1,290	1,294	508
Domestic logs		-	-	487	645	604	371	403
Softwood		-	-	-	499	512	292	372
Hardwood		-	-	-	146	92	79	31
Production of sawn timber	1,000 m^3	1,148	2,241	2,977	2,952	3,897	4,041	3,440
Capacity utilization	%	38	50	53	54	71	76	72
No. of sawmills	factory	1,912	1,977	2,019	1,956	1,659	1,477	1,402
No. of employees	people	-	-	-	15,650	20,022	14,476	12,592

Source: Forestry Administration

Consumption

In Korea, sawn timber is mainly consumed for construction and engineering work. About 73% of sawn timber is used in construction and engineering. The construction and engineering companies order the sawn timber for their needs and their favourite sizes. The 73% of domestic logs and 83% of Hemlock imported from North America is produced by special order.

In future, the consumption of sawntimber will be changed depending the construction and engineering work in domestic, and packing for the export goods. A lot of substitute will be developed according to the sawntimber price increase. Therefore the consumption demand for sawn timber will increase slightly as follows; 4,692 thousand in 2010, 4,972 thousand in 2020, and 5,059 thousand in 2030.

Table 18. The share of sawn timber by use

Total	Construction and Engineering	Packing	Agricultural Equipment	Other
100.0%	73.2%	10.2%	1.7%	14.9%

Source: Forestry Research Institute

Imports

The share of imported sawn timber has rapidly increased from 44 thousand cubic metres in 1980 to 1,279 thousand cubic metres in 1993. In 1995, it recorded 1,016 thousand cubic metres. The rapid increase in imports of sawn timber caused the slump of domestic sawmill industry. Recently some Korean sawmills employ foreigners from other Asian countries because of shortage of Korean workers and their high labour costs. The import of sawn timber is expected to increase rapidly. Usually sawn timber has been imported from Malaysia, USA.

Table 19. Imports of sawn timber

Classification	Unit	1980	1985	1990	1995
Quantity	1,000 m^3	44	169	691	1,016
Value	1,000$	7,535	29,179	166,661	408,530

Source: Forestry Administration

Exports

Korea exports a very limited quantity of sawn timber. Sawn timber exports were only 3 thousand cubic metres in 1970, increased slowly and peaked at 376 thousand cubic metres ($82.262 million) in 1980. After that it decreased rapidly, and in 1995, of the total production of 3,440 thousand cubic metres, the export is only 14 thousand cubic metres in 1995.

Table 20. Trend of sawn timber exports (Unit: 1,000 m^3)

1970	1975	1980	1985	1990	1994	1995
3	183	376	161	161	37	14

Source: Forestry Research Institute

3.5 Woodpulp

Production

Korea produces 3 kinds of pulp; chemical, mechanical and chemi-mechanical pulp. The number of pulp factories is 5, among them 1 chemical, 3 mechanical, 1 chemi-mechanical factory. The production capacity of domestic woodpulp increased from 525 thousand M/T in 1988 to 849 thousand M/T in 1993 following the expansion of production capacity by Donghae Co. Ltd. and Hansol Forem Co. Ltd. Chemical pulp increased from 161 thousand M/T to 385 thousand M/T, and chemi-mechanical pulp from 237 thousand M/T to 337 thousand M/T in 1993. There is no production change in mechanical pulp.

Table 21. Change of production capacity of pulp industry (Unit: 1,000 M/T)

Company	Classification	1988	1989	1990	1991	1992	1993	1994
Company A	Chemical	161	161	161	161	161	385	385
Company B	Mechanical	83	83	83	83	83	83	83
Company C	Mechanical	32	32	32	32	32	32	32
Company D	Che.Mecha	237	237	237	237	237	337	337
Company E	Mechanical	12	12	12	12	12	12	12
Total (5 Companies)		525	525	525	525	525	849	849

Source: Korea Paper Industry Association

The capacity utilization of pulp mills is about 60%. The self-sufficiency of pulp is 23% and the rest was imported in 1995. The production of woodpulp in Korea depend on mechanical pulp before the mid 1980s, but after that, the production of chemical pulp increased, and the share of chemical pulp is higher than that for mechanical pulp. From 1975 to 1995, chemical pulp has increased from 7 thousand M/T to 319 thousand M/T, but the mechanical pulp increased from 87 thousand M/T to 181 M/T.

Table 22. Production of pulp in Korea (Unit: 1,000 M/T)

Classification	1975	1980	1985	1990	1995
Total	94	167	267	301	501
Chemical	7	29	129	142	319
Mechanical	87	137	138	159	181
Ratio of self sufficiency (%)	29	28	32	21	23

Source: Korea Paper Industry Association

The raw material for mechanical pulp was mainly domestic pine logs in the past, however recently the mechanical pulp factory changed the purchase pattern from logs to softwood chips. Also chemical pulp company imported woodchips as the raw material. Therefore the imported amount of chemical pulp increased rapidly.

Table 23. Change of raw material for pulp (Unit: 1,000 m^3)

Classification	1988	1989	1990	1991	1992	1993	1994
Total	687	664	641	682	681	1,066	1,220
%	98.1	79.9	79.9	67.9	65.3	37.7	35.5
Mechanical pulp							
Subtotal	252	230	203	256	257	245	284
Domestic pine	252	230	203	201	245	245	284
Imported pine	-	-	-	55	12	-	-
Chemical Pulp							
Subtotal	453	433	438	426	424	821	936
Domestic hardwood	236	187	204	192	141	132	149
Domestic softwood	143	113	105	70	59	25	-
Imported timber	56	133	129	164	224	664	787

Source: Forestry Administration

Consumption

Pulp is usually used for the paper production; the consumption of pulp increased 24 times from 92 thousand M/T in 1965 to 2,170 thousand M/T in 1994, and the consumption of waste paper also increased 182 times from 46 thousand M/T in 1965 to 4,704 thousand M/T in 1994. In the early 1970s, the share of pulp for paper production was greater than that of waste paper but after that, waste paper has become more popular than pulp as raw material to produce the pulp.

The share of pulp in raw material for paper production is about 35% in 1994. The share of the domestic pulp among the pulp supply has also decreased compared to the past; it occupied a quarter of the whole pulp supply.

Table 24. Trend of demand and supply for raw material to produce the paper (Unit: 1,000 M/T)

Classification	1965	1970	1975	1980	1985	1990	1991	1992	1993	1994

Total	138	368	714	1,692	2,353	4,799	5,184	5,700	6,166	6,874
Domestic	72	182	303	749	1,085	2,176	2,418	2,636	3,150	3,826
Imported	66	186	411	943	1,268	2,623	2,766	3,064	3,015	3,048
Pulp	92	239	325	620	835	1,457	1,540	1,767	1,923	2,170
Domestic	33	80	94	167	268	301	324	311	449	521
Imported	59	159	231	453	567	1,156	1,216	1,456	1,474	1,649
Waste Paper	46	129	389	1,072	1,518	3,342	3,644	3,933	4,243	4,704
Domestic	39	102	209	582	817	1,875	2,094	2,325	2,701	3,305
Imported	7	27	180	490	701	1,467	1,550	1,608	1,542	1,399
Share of Pulp (%)	66.7	64.9	45.5	36.6	35.5	30.4	29.7	31.0	31.2	31.6
Production of Paper	120	330	662	1,680	2,312	4,524	4,922	5,531	5,840	6,435

Source: Forestry Administration

Table 25. Scenario of demand forecasting for Korea woodpulp (Unit: 1,000 M/T)

Year	2000	2010	2020	2030	Assumption
Woodpulp	1,955	2,128	2,259	2,286	annual pulp price
Economic growth ratio assumption (%)	6.90	4.27	4.00	.50	increase is 0.14%

Source: Korea Rural Economic Institute

Imports and Exports

The pulp import increased nearly 3 times from 1985 to 1994 because of the shortage of domestic pulp production. In 1994 it occupied about 70% of the whole pulp consumption in Korea, and it totalled 1,649 thousand M/T. There is no pulp export from Korea.

3.6 Paper and Paperboard

Production

In 1995, the production capacity of paper is 7,285 thousand M/T, and it had increased 39.3% compared to 5 years earlier. Production capacity of Korea is the 10th in the world, but the paper companies have difficulties of raw material supply compared to timber resource rich countries. The increase in printing paper production is 59%, and in news print is 58%.

The number of paper companies was 113, and of mills was 135 in 1995. Up to 1971, the last year of the 2nd 5 Year National Economic Plan, news print and printing paper were the main products, but from 1972, kraft paper and board have been the main items. This is because of the increase of packing paper according to the development of industry.

Table 26. Production of paper in Korea (Unit: 1,000 M/T)

Classification	1970	1975	1980	1985	1990	1995
Total	330	662	1,680	2,312	4,524	6,877
News print	102	155	249	239	522	948
Wood free paper	53	73	160	198	320	495
Wood containing	11	32	69	156	266	189
Art paper	9	26	64	129	333	745

Kraft paper	48	87	184	171	231	266
Manila board	33	98	237	314	682	943
Corrugated board	46	125	514	712	1,384	2,122
Board paper	5	12	38	99	206	235
Other	23	51	165	295	580	925

Source: Korea Paper Industry Association

The production of paper in 1965 is only 120 thousand M/T, but it increased 53 times to 6,435 thousand M/T in 1994. In 1995, the total amount of paper production was 6,878 thousand M/T, of which only 948 thousand M/T for news print. The increase rate of corrugated board and manila board is also very rapid.

Consumption

Korea consumed the total of 7,417 thousand M/T in 1995 of which 6,877 thousand M/T of paper is supplied domestically and 697 thousand M/T is imported.

Table 27. The demand and supply of paper in Korea (Unit: 1,000 M/T)

Year	Demand			Supply		
	Domestic	Export	Total	Domestic	Import	Total
1991	4,867	458	5,325	4,922	413	5,335
1994	6,104	952	7,056	5,434	562	6,996
1995	6,423	994	7,417	6,877	697	7,574

Source: Korea Paper Industry Association

In 2010, paper demand is estimated 11,939 thousand M/T by K.R.E.I. and 12,617 thousand M/T by FAO.

Table 28. Scenario of demand forecasting for Korea paper (Unit: 1,000 M/T)

Year	2000	2010	2020	2030	Assumption
Paper demand	8,219	11,939	16,748	21,958	annual paper price
Economic growth ratio assumption (%)	6.90	4.27	4.00	3.50	increase is 0.04%

Source: Korea Rural Economic Institute

Table 29. Forecasting of the paper consumption in Korea in 2010 (Unit: 1,000 M/T)

Total	Newsprint	Printing and writing	Other
12,617	723	2,557	9,337

Source: FAO

Imports

In 1995, Korea imported the total of 697 thousand M/T. It is also increased 24% compared to 1974. This is because of import increase of newsprint and other special purpose paper. But due to the increased local production capacity, this decreased from 1996.

Exports

The export trend of paper and board is slowly increasing. In 1994, Korean exported the total amount of 952 thousand M/T, an increase of 4.4% compared to that of 1994. Among them the board is 555 thousand M/T (58%), and printed paper is 308 thousand M/T (32%). But the value of paper export is $1,125 million which is an increase of 42.5% compared to 1994.

Table 30. Export of paper and board (Unit: 1,000 M/T)

Year	Total	Newsprint paper	Printed paper	Board	Other
1980	31	-	-	14	17
1985	91	-	1	27	63
1990	274	40	35	70	129
1991	412	120	78	76	138
1992	489	200	51	93	145
1993	695	16	171	472	36
1994	952	29	308	555	60

Source: Korea Paper Industry Association

3.7 Particleboard and Fibreboard

Production

In 1995, Korea had 4 particleboard companies and 5 factories with a production capacity of 577 thousand cubic metres. It is estimated that they consume 931 thousand cubic metres of wood every year. The number of fibreboard companies is 5 and they have 10 factories with an annual production capacity of 1,042 thousand cubic metres and raw material consumption of 1,763 thousand cubic metres. When we assume their average capacity utilization as 110%, their real production of particleboard will be 624 thousand cubic metres, and of fibreboard 1,146 thousand cubic metres. Also, the raw material for particleboard and fibreboard is expected to be 2,694 thousand cubic metres per year. Up to now, the raw material for particleboard and fibreboard is mainly the waste products from sawmill, but recently the use of log is more popular because of collection difficulties of sawmill wastes. In 1992, of the total use of wood raw material for boards in Korea, logs were only 55 thousand cubic metres (5.1%), but in 1993, this share increased to 17.7% of the 1,260 thousand cubic

metres, and 21.1% in 1994. It was expected to reach 37.3% in 1996. The production of 15 mm particleboard is 67.8% of total production while for fibreboard there is no dominant thickness.

Table 31. Status of particleboard and fibreboard company (1995)

Classification	Company	Location	Starting Year	Production Capacity (m^3/y)*	
	Company A	Inchon	1981	128,000	(22.6%)
Particleboard	Company B	Inchon 1	1978	48,000	
		Inchon 3	1995	135,000	(32.2%)
	Company C	Ulsan	1992	128,000	(22.6%)
	Company D	Asan	1992	128,000	(22.6%)
	Subtotal (4)	(5 factories)		567,000	(100.0%)
	Company A	Inchon	1989	58,000	(5.6%)
	Company B	Inchon 1	1986	64,000	
		Inchon 2	1989	76,000	
		Inchon 3	1994	100,000	(23.0%)
Fibre-board	Company C	Inchon	1995	100,000	
		Ansan	1961	26,000	(12.1%)
	Company D	Gunsan 1	1991	128,000	
		Gunsan 2	1995	160,000	(27.6%)
	Company E	Asan	1991	100,000	
		Iksan	1995	230,000	(31.7%)
	Subtotal (5)	(10 factories)		1,042,000	(100.0%)

* The share of ( ) means the total share of one company
Source: Forestry Research Institute

Over half (53.9%) of particleboard capacity is located in Inchon with 22.2% each respectively in Ulsan and Asan. For fibreboard 30.2% of capacity is also in Inchon, 9.5% in Asan, 27.6% in Gunsan and 22.1% (one, largest single factory) in Iksan. 67.8% of particleboard and 56.6% of fibreboard capacity has been added since 1992.

Due to recent increased use as plywood substitutes, the production of particleboard and fibreboard is steadily growing. In case of fibreboard, it is expected that supply will temporarily exceed the demand. The production of particleboard increased from 13 thousand cubic metres in 1966 to 524 thousand cubic metres in 1944, and fibreboard also increased from 10 thousand cubic metres in 1966 to 506 thousand cubic metres in 1994.

Table 32. Production and import of particleboard and fibreboard in Korea (Unit: 1,000 m^3)

Year	1966	1970	1975	1980	1985	1990	1991	1992	1993	1994
Particleboard	13	16	39	68	167	568	648	771	960	927
Domestic	13	16	39	68	110	165	155	320	444	524
Import	-	-	-	-	57	403	493	451	516	403
Fibreboard	10	15	16	14	41	258	372	438	552	689
Domestic	10	15	16	14	14	167	301	354	408	506
Import	-	-	-	-	27	91	71	84	144	183

Source: Forestry Research Institute

Consumption

Particleboard is mainly used for the kitchen furniture, and fibreboard is mainly used for the general furniture. Consumption demand for board in future will be estimated to 2,163 thousand in 2010, 2,461 thousand in 2020, and 2,758 thousand in 2030.

Table 33. Ratio of board by use in Korea (Unit: %)

Classification	Total	Particleboard	Fibreboard
Total	100.0	100.0	100.0
For Kicken Furniture	34.9	55.0	-
For Office Furniture	19.5	25.0	10.0
For Instrument Cases	10.0	10.0	10.0
For General Furniture	26.5	5.0	60.0
For musical Instruments	4.1	-	15.0
Etc.	5.0	5.0	5.0

Source: Forestry Research Institute

Imports and Exports

In 1985, particleboard was imported 57 thousand cubic metres; this increased to 403 thousand cubic metres in 1994. For fibreboard, corresponding imports were 27 thousand cubic metres in 1985, and 183 thousand cubic metres in 1994 (Fibreboard exports were 7 thousand cubic metres in 1994, and 19 thousand cubic metres in 1995).

3.8 Plywood and Veneer

Production

Plywood manufacture led the timber-related industry in 1970s and 1980s but because of the difficulty of tropical log import and the labour cost increase, its competitiveness declined in the 1990s. The number of plywood factories was only 6 in 1966, reached to 88 in 1985, then decreased slowly to reach 18 in 1994 because of various management difficulties; the survivors were mainly those which developed value added products for the domestic market. The plywood industry used to employ the biggest number of people in the timber related industry. The number of workers increased to a maximum of 29,857 in 1979, but this decreased until by 1994, only 4,259 of workers were employed in the plywood industry.

The production of plywood in 1966 was 445 thousand cubic metres, and the production amount increased steadily, and it peaked in 1978 at 2,557 thousand cubic metres,

and after that it decreased slowly. The production of 1995 was only 974 thousand cubic metres or 38% of the peak volume. The thickness of major products of plywood in the past was 6 mm for furniture, but recently it changed to 12 mm for construction, engineering and concrete panels for the domestic market. And the production for export is very limited.

Table 34. Production and consumption of plywood (Unit: 1,000 m^3)

Classification	1966	1970	1975	1980	1985	1990	1994	1995
No. of factories	6	10	14	84	88	72	18	-
Production capacity	557	1,449	2,426	2,517	2,409	1,329	1,069	1,032
Production	445	1,067	1,809	1,575	1,227	1,124	886	974
Production per factory	74	107	129	19	14	16	49	-
Export	346	1,055	1,304	953	127	76	61	104
Import	-	-	1	23	11	735	1,003	1,307
Factory capacity utilization (%)	79.9	73.6	74.6	62.6	50.9	84.6	82.9	94.4
Consumption	97	234	502	691	1,035	1,746	1,837	-
share of import (%)	-	-	0.2	3.3	1.1	42.1	54.6	-

Source: Forestry Research Institute

The plywood industry has depended for raw material on imported logs. In 1970s and 1980s, the species of imported log for plywood industry was mainly Lauan, and after that it changed to Kapol, Keruing, and other mixed tropical hardwood species. Recently softwood is also imported for plywood raw material.

In 1994, the species breakdown of imported logs for plywood was as follows: mixed tropical hardwood was 73.2%, softwood was 15.2%, Kapol and Keruing was 8.1%, Lauan was 0.2%.

Consumption

The total consumption of plywood increased to 1,837 thousand cubic metres in 1994 from 97 thousand cubic metres in 1966. The consumption of plywood was mainly for furniture and packing and concrete form work panel. The consumption for furniture and packing is provided from imported plywood, and the domestic production is usually for 12 mm to use for concrete form work panels.

Table 35. Consumption pattern of plywood in Korea (Unit: 1,000 m^3)

Classification	Year	Total	<3.5 mm	3.6-5.9 mm	6.0-11.9 mm	>12.0 mm
Import	1992	953	507	148	222	76
	1993	1,153	489	181	340	143
	1994	1,003	387	118	308	190
Domestic	1992	948	140	38	28	742
	1993	898	73	23	14	788
	1994	886	34	23	13	816

Source: Forestry Research Institute

Table 36. The share of plywood consumption by use(Unit: %)

Classification	Total	Construction	Building Structure	Container	Furniture	Packing	Other
Total	100.0	35.7	18.0	3.0	37.2	0.2	5.9
Domestic	100.0	42.7	25.4	7.6	10.2	0.2	13.7
Import	100.0	31.2	13.2	-	54.8	-	0.8

Source: Forestry Research Institute

The consumption will be expected to reach 2,813 thousand cubic metres in 2000 and 3,028 cubic metres in 2010.

Table 37. Scenario of demand forecasting for Korea plywood (Unit: 1,000 m^3)

Year	2000	2010	2020	2030	Assumption
Plywood demand	2,813	3,028	3,175	3,171	annual plywood price
Economic growth ratio assumption (%)	6.90	4.27	4.00	3.50	increase is 0.05%

Source: Korea Rural Economic Institute

Imports

Since 1990, much plywood has been imported from the tropical countries and the share of imported plywood is now more than 50%. Generally the thickness of imported plywood is mainly under 11.9 mm for furniture and packing.

Exports

Korea exported the a total of only 61 thousand cubic metres of plywood in 1994, and 104 thousand cubic metres in 1995 to China.

4. OTHER FORESTRY ROLES AND DIMENSIONS

4.1 Fuelwood and Wood Energy

In the 1960s, the Government established 1 million ha of fuelwood forest. However because of the successful economic development and urbanization, the need for fuelwood forest decreased as the dependency on fuelwood as an energy source decreased compared to the past. At present, the ratio of dependency on fuelwood forest is very low: in 1995, a total of 224 thousand M/T was consumed in rural area households.

Table 38. Production of firewood in Korea (Unit: 1,000 M/T)

Year	1975	1980	1985	1990	1995
Total	5,604	4,700	3,180	1,401	224
Firewood	169	142	269	271	75
Charcoal	8	9	1	1	1
Branch	2,814	2,433	2,334	897	147

Source: Forestry Administration

4.2 Non-wood Forest Products

The main monetary product from forest in Korea is the by-products such as chestnut and mushroom. Especially chestnut and mushroom are exported, already contribute to forest owners' income and are expected to increase in future. In case of chestnut, Korea produced 93.6 thousand M/T and of this, 31% was exported in 1995, mostly to Japan. The production of walnut and jujube increased because of the extensive management, increase in cultivated area and household income.

Table 39. Production of non-wood forest product (Unit: M/T)

Classification		Unit	1980	1985	1990	1995
Chestnut	Production	M/T	42,826	72,000	85,043	93,654
	Export Amount	M/T	17,798	23,594	36,471	28,860
	Export Value	1,000$	36,771	37,427	94,279	114,768
Oak and Pine	Production	M/T	1,528	3,067	2,997	4,106
Mushroom	Export Amount	M/T	1,012	1,750	1,891	1,367
	Export Value	1,000$	24,225	43,453	76,595	79,185
Jujube	Production	M/T	641	3,774	5,953	13,180
Walnut	Production	M/T	161	706	906	1,311

Source: Forestry Administration

4.3 Wildlife Conservation and Forest Recreation

The history of protection forest in Korea started from the Great Korea Empire in 1905 by Forest Law. As of 1995, the area of protection forest in Korea was 208.5 thousand ha, and

of this, the area of protection forest for water conservation was 157.8 thousand ha (76% of total protection forest), for scenic beauty 34.5 thousand ha (16%), and for other functions 8%.

A total of 371 species of birds and 95 species of wildlife animals are recorded in Korea. For effective conservation and propagation of wildlife, the Wildlife and Hunting Law was enacted in 1967, which strictly prohibits hunting. However, the law was completely revised on July 1, 1984, for effective protection of wildlife and promotion of sound hunting. Hunting was prohibited from 1972 throughout the country expect for certain areas. The prohibition of hunting was carried out along with the nature conservation campaign. So far thirty two areas have been designated as wildlife protection areas and 32 rare wild animals were designated as natural monuments.

Due to the long-term prohibition of hunting since 1972, wildlife density has increased and some species were overcrowded in certain areas. Therefore, maintaining a desirable density of wildlife and promotion of sound hunting should be considered. Hunting has allowed at two permanent and one temporary hunting area since 1981. Opening of temporary hunting area hunting area during which limited hunting is permitted is done for one province in turn each year. In such cases, hunting in the area is allowed from November 1 to February 28 for 22 bird species and 3 animal species. Anyone who wants hunting must undergo state education for hunting in order to be able to quickly identify game species and for safety.

To preserve natural scenery and to provide a better environment for recreation, the Park Law was enacted in 1967. Park are classified into three categories: National, Provincial and City parks. National parks represented the natural beauty of Korea and the Ministry of Construction can order the designation and management of the park. Provincial parks should represent the characteristics of the provincial beauty and the governor of the province has the right of designation and management. City parks are made under the City Planning Law to provide recreation and green areas for city residents. The number of national park was 17 in 1985 and rose to 20 by 1996. The trend of national parks visitors are shown in Table 40.

Table 40. Trend of National Prak Visitors (Unit: 1,000 person)

Year	Number of National Park Visitors	Number of Mountain-type National Park Visitors	Population
85	26,420	18,560	40,806
86	28,388	19,841	41,214
87	31,082	22,071	41,622
88	37,989	25,380	42,031
89	39,216	27,290	42,449
90	39,147	26,969	42,869
91	33,976	22,390	43,268
92	33,681	22,646	43,663
93	32,403	22,755	44,056
94	36,398	23,985	44,456

Source: National Park Association

Forestry Administration also permit the development of recreation sites in forests to provide outdoor recreation facilities to people according to the Forest Law. The number of recreation sites in forests was 56 in 1995, and will increase to 100 up to 2010. The visiting number also will be increased rapidly in future.

In 1996, the Forestry Research Institute evaluated the total value of non-timber products of forests - clean water and air production, forest recreation site, forest soil conservation, wildlife protection and etc. - as $41.2 billion, and it increased rapidly compared to past. Government has designated some forests which are important for public welfare as protection forests.

5. FORESTRY POLICIES LEGISLATION AND INSTITUTIONS

5.1 Main Forestry Policy in Future

In Korea, the most important forest policy up to now is reforestation. It has been necessary and urgent for Korea to accomplish the reforestation and erosion control as soon as possible in order to increase protection from the loss of farmland, droughts, floods, etc.. As a result, international organizations like FAO, WRI consider Korea as an outstanding example of a successfully reforested country in the world. However the reforestation in Korea should be more evaluated than any other countries from the point of view of intentional reforestation of devastated mountains, not for industrial timber production.

The current objectives of Korean forest policy can be summarized as follows: first, harmonious forest land management between conservation and development, second, fostering competitive forestry by improving the management and structure, and finally establishment of land environment to improve living conditions and to preserve beautiful landscapes. In future, Forestry Administration will focus on the following main targets:

First, improvement of reasonable forest land use system. As a result of rapid economic development, the demand of forest land for other uses has accelerated. Therefore it is important to meet various demands for forest land use resulting from socio-economic progress, and to reserve forestry production area as a timber supply base, and to manage forest lands based on harmonizing balance between conservation and development in the programme for complex land development in a small country.

Second, acceleration of establishment of new forest resources, and protection and fostering of existing forest resources. Establishment of commercial forests is emphasized at Forestry Promotion Development Areas. The share of the proportion of man-made forests in the total forests is planned to rise from 31% in 1992 to 47% in 2030 and self-sufficiency ratio of log from 13% in 1993 to 46% in 2030. In addition, it is intended to emphasize protection activities against forest fire, disease and insect pests, and the diversion of forest for other industrial uses.

Third, enlargement of forest management infrastructure and improvement of forest management structure. Forest roads are necessary for the basic forest management facilities for reforestation, tending, control of forest fire, diseases and insects, and the transportation of various forest products as well as the improvement for local transportation and development of recreational resources. The Korean government has planned to construct more forest road, which were 7,114 km (1.10m/ha) at the end of 1994 to 56,000 km (8.6m/ha) in 2010. The

mechanization of forest works has been accelerated to increase productivity and to reduce management costs.

The enlargement of national forest has been accelerated to secure the greater timber supply and to promote public benefits of the forests, and the share of national forest lands is scheduled to expand to 2,063 thousand ha, 33% of the lands in 2040. Forest cooperatives, which intend to expand forest management units to as much as 3,000 ha through mutual cooperation among small-scale private forest owners, are encouraged. Forest development funds need to be increased to encourage forest owner's investment motivation.

Fourth, enhancement of environmental forestry for promoting public benefits of the forests. The government is enlarging natural recreation forests, forest camps and arboreta for utilizing forest resources as resting places.

Fifth, enlargement of overseas forest development and improvement of forestry industry. To respond to the environment conservation and log-export bans in timber export countries, the government is also trying to shift its strategy of timber import from purchase imports to “development import” by expanding overseas reforestation projects from which timber supplies can then be imported. Also it is scheduled to promote the restructuring of the timber industry to better adapt to economic change in domestic and overseas markets. Marketing channels such as timber storage and processing factories for forest products are planned to increase from 29 places in 1992 to 120 places in 2001 to increase forest owner's income and to stabilize the price of forest products.

Sixth, development and extension of forestry techniques. Forest research is being conducted in various fields such as development of new high quality species applying advanced technology and improvement of local tree species, high utilization and development of new uses for forest products, technology of forest disease and insects control, conservation of forest environment and improvement of public benefits of the forests. At the same time, extension of forestry techniques are emphasized to sincere forest managers, forestry successors and large-scaled forest owners.

5.2 Environmental Issues and Initiatives - Sustainable Forest Management

Up to now the most important forest policy in Korea is the reforestation up to now. It was necessary and urgent for Korea to accomplish the reforestation and erosion control and increase the forest stock as soon as possible. And it has been evaluated as a successful policy in the world as indicated earlier. The current objective of Korean forest policy is to increase the efficiency of sustainable forest management.

After UNCED, there have been a lot of meetings to find out the standard operating procedure (SOP) of sustainable forest management (SFM). Thus international efforts such as Helsinki process and Montreal process have been initiated to determine criteria and indicators for measuring sustainable forest management. Korea also participated in the international meetings to contribute its own experience in world-wide sustainable forest management, and try to adapt the SFM’s SOP to management of the forests in Korea. Korea is a member of the Montreal Process, the member countries of which have 90 percent of the world's temperate and boreal forests.

In February 1995, the Working Group on Criteria and Indicators for the conservation and Sustainable management of temperate and boreal forests (Montreal Process) agreed criteria and indicators for the conservation and sustainable management of temperate and boreal forests. This is called Santiago declaration, which agreed upon 7 indicators for the conservation and sustainable forest management for use by their respective policy makers.

Criterion 1. Conservation of biological diversity
Criterion 2. Maintenance of productive capacity of forest ecosystems
Criterion 3. Maintenance of forest ecosystem health and vitability
Criterion 4. Conservation and maintenance of soil and water resources
Criterion 5. Maintenance of forest contribution to global carbon cycles
Criterion 6. Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies
Criterion 7. Legal, institutional and economic framework for forest conservation and sustainable management.

The indicators for these criteria emphasize the economic and social aspects for sustainable forest management. The indicator for the Criterion 6 include production and consumption, recreation and tourism, investment into the forest sector, cultural, social and spiritual needs and values, employment and community needs. Especially Criterion 7 is strongly related to the overall policy framework of a country that can facilitate the conservation and sustainable management of forest.

Korea faces several problems in implementing the forest policy under the circumstance of emphasizing the sustainable forest management: first, the absolutely insufficient forest resources for Korea's present and future generations; second, the unbalanced forest ownership in public and private forest land, which might hinder efficient forest land use; third, the evasion of participation of private forest owners due to insufficient investment environment such as the low profit, long-term period of investment; fourth, the overlapping regulation of forest land management because of the strong demand for multiple uses by several parties.

In other words, one of biggest problems for forest sustainable management in Korea is the forest owner's limited interest in forest management because of small scale. Therefore the optimization of forest management unit is essential for the sustainable forest management, especially in private forests. Therefore, the activities of Forestry Cooperatives, which intend to expand forest management units to as much as 3,000 ha through mutual cooperation among small-scaled private forest owners, will be heavily encouraged for the small scale forest to be managed sustainably.

Generally, developed countries have abundant forest resources, which are maintained very carefully from the past. However, it is impossible to obtain beautiful forest on money alone in a short period; it needs time and the endless willingness and effort of people to maintain the sustainable forests in good condition.

5.3 Sustainable Forestry Development through Forestry Cooperatives

In Korea, forestry activities have traditionally been accomplished by the government, private sector and Forestry Associations. Forestry Associations in Korea are based on the rural people's self-regulated organization from the 15th century, named "Sanrimgae" for forest protection. The Sanrimgae have been reorganized into modern form for the 20th century. The modernized Forestry Association's main purposes are supervision of forestry related business affairs including execution by proxy of government forest projects, establishment of the foundation for self-supporting operation, systematic organization and structure adjustment.

However because of the Forestry Associations two purposes for establishment, the two development way, the different membership in unit level, it is reasonable for Forestry Association to change into the Forestry Cooperative, the purpose of which should be the economic one of protecting the member's welfare. It means that the organization for forest owners excludes the government's interference on Forestry Association up to now.

Government has supported about 770 forest technical guides to the provincial Forestry Associations during the past 10 years, who can consult with forest owners and can provide the advanced forest technical and economical information. However because of economic weakness of forest management, the forestry guidance project faces financial constraints. The forest land owners feel uncomfortable with the Forestry Association's negative or inadequate activities and complain about that. Therefore, for the future development of Korea's forestry, it is essential to have the forest owner's voluntary participation, and it is also urgent for the Forestry Associations to be able to accomplish their organizational constitutional development.

The Forestry Cooperatives, which are non-governmental forest organizations, play important roles in implementing the forest owner's activities. The goal of Forestry Cooperatives is to manage their forest rationally by enlarging management scale through cooperating production elements such as forest land, labour, and capital of the small-scale private forest owners, and to improve the socio-economic position of the members. In 1993, the Forestry Associations were reorganized into Forestry Cooperatives, whose members are forest owners who want to voluntarily participate. For the cooperatives predecessors, the Forestry Association, membership included all forest owners and village residents in mountain areas for reforestation and forest protection. For this, "Forestry Cooperatives Law" replaced the "Forestry Association Law" in the same year.

Now the Forestry Cooperatives have 2 levels, one is the unit level in 142 Gun Provinces, and the other is the Federal Cooperatives of which the individual forestry cooperatives are members. The former Forestry Association had 3 levels, and units were village forest associations composed of forest owners and neighbours in the village. It was a useful mechanism for government to reforest and protect the forest surrounding the villages. The number of the unit associations was about 20,000, and the number of the middle level organizations "provincial forest associations" (which had the unit village forestry associations as members) was about 142. The Federal Association had the provincial Forestry Association as members. However it is more helpful for forest owners if there are reduced levels in the organization, because of multi-level disadvantages for sustainable forestry development. Between now and 2010, the 3rd level, "Sanrimgae" will be disbanded and will disappear.

After 1993, there are many changes in Forestry Cooperative's activity, and a lot of advantages for sustainable forest management in Forestry Cooperatives' business.

The diversity of Forestry Cooperative's business

The current business of Forestry Cooperatives includes planning of reforestation, management and harvesting, collection, storage, selling of forest products, and loans of forest funds. Among them, the silviculture for the member increased 2 times in 2 year from 1993 to 1995. And by-product marketing such as mushroom also increased 1.8 times. Federal Forestry Cooperatives are also considering to supply the drinking water, which is produced in mountain areas, to urban people to increase the efficiency of member's forest management.

The intensification of extension service for member

Currently the members of Forestry Cooperatives are 457 thousand people (23% of total forest land owner). They have 410 thousand ha of forest which is only 10% of total forest. Compared to the former Forestry Association, it is only 25%. Even though the number of Cooperatives is lower compared to that of Associations, the inner development power is greater than before; the members of Forestry Cooperatives participate more actively than before.

Therefore Forest Cooperatives will lead the sustainable forest development of private forest in Korea. Especially it is very exciting for the members to have the more chance to receive the forest guidance of Forestry Cooperatives due to the reduction of members. The ratio of extension visits by extension agents has increased about 5 times in 2 years after transformation into Forestry Cooperatives. In 1993, every member of Forestry Association had the chance to meet forest guide 0.2 times per year, however after transformation in Forestry Cooperatives every member meet them 5 times in a year. It will give the chance to Forestry Cooperative's member to get more adequate information for sustainable forest management.

However it is also a problem for the Forestry Cooperatives to increase their membership and to expand the forest area of members for the sustainable forest management.

The strengthen of financial support by Government

To stimulate the activity of Forestry Cooperatives, Government also increased the financial support for the small-scale forest owner. Especially the special financial subsidy increased 4.4 times in 2 years. With this Federal Forestry Cooperatives started the mutual financial business in 1994, and 57 Forestry Cooperatives joined this business, and the total amount is about 0.2 billion dollars in 1995.

The construction of international cooperation for sustainable forest management

The sustainable forest management (SFM) is the core target for the 21 century. Fortunately, Korean Forestry Cooperatives was permitted to get the membership of the International Cooperatives Alliance (ICA) in June 1996, and it would be the good chance to strengthen the cooperation for sustainable forestry development with the other countries in future.

5.4 Forest Administration

The first forestry organization was officially established in 1908 during the time of the Great Korean Empire. After establishment of the Republic of Korea, the Department of Forestry enlarged to Forestry Administration to accomplish successfully the reforestation in denuded mountains in 1967. However in 1973, Forestry Administration moved to Ministry of Home Affairs from Ministry of Agriculture and Forestry to strengthen the duty of forest protection like ban of fire shifting cultivation, control of forest fire and diseases and to more easily mobilize the villagers to plant the trees. In 1987, Forestry Administration moved again under Ministry of Agriculture, Forestry and Fisheries with the appraisals of accomplishment of the successful reforestation. Recently, in order to emphasize the role of forest for the global environmental preservation, Forestry Administration attaches importance to environmental forestry as well as to economic forestry.

Forestry Administration administer forest policy, executing laws relating to forests and forestry, and also supports and implements all types of forestry activities such as the formation and management of forest resources, protection and development of forests, utilization and development of forest products, research and training on forestry, sustainable forest management, extension service through Forestry Cooperatives, and etc..

6. KOREA FORESTRY IN A GLOBAL CONTEXT

6.1 Trend of Forest Products' Trade Flows

In 1995, the export value of forest products was $505 million, and its share was 0.4% of the total value of export. The main export item in forestry is chestnut, pine mushroom, oak mushroom, and plywood. The plywood export quantity increased 70% compared to 1994. The export value is also increased 22%. The value of wood and wooden exports is $70,940

thousand, and it decreased 3%. The main export country is Japan, its share is 77%. In 1995, the total value exported to Japan is $388 million.

The total import value of forestry products was $2,779 million, and its share among the total import of $135,118 million was 2.1% in 1995. The main import items are logs, sawn timber, plywood and by non-forest products such as oak mushroom. The trend of wood and wooden products imports is the same with the past. Log imports decreased from Malaysia, USA, and increased from New Zealand and Chile. The log imports by country are as follows: New Zealand is 3,003 thousand cubic metres, Chile is 1,539 thousand cubic metres, USA is 803 thousand cubic metres, PNG is 736 thousand cubic metres, Russia is 730 thousand cubic metres, Malaysia is 656 thousand cubic metres. The import of sawn timber is 1,016 thousand cubic metres, and it increased from 886 thousand cubic metres in 1994. 468 thousand cubic metres imported from Malaysia, USA is 195 thousand cubic metres, New Zealand is 61 thousand cubic metres, Canada is 55 thousand cubic metres, Indonesia is 53 thousand cubic metres. The import of plywood decreased from Indonesia, and increased from Malaysia. The import amount from Indonesia was 836 thousand cubic metres.

Table 41. Import of major forest products

Classification	Unit	1980	1985	1990	1995
Total value	1,000$	912,087	629,406	1,721,239	2,778,983
Wood sub-total value	1,000$	899,155	589,631	1,605,060	2,596,257
Round log quantity	1,000 m^3	6,141	5,578	8,285	8,229
value	1,000$	858,228	479,356	990,474	1,047,332
Lumber quantity	1,000 m^3	144	169	691	1,016
value	1,000$	7,535	29,179	166,661	408,530
Plywood quantity	1,000 m^3	23	11	735	1,307
value	1,000$	14,357	5,059	256,164	593,861
Rubberwood value	1,000$	19,035	76,037	191,761	546,534
Bamboo quantity	M/T	24,324	7,953	5,499	621
value	1,000$	4,380	1,487	1,110	511
Others value	1,000$	8,552	38,288	74,472	182,215

Source: Statistical Yearbook of Foreign Trade

6.2 Investment of Overseas Forestry

A total of 25 Korean companies have participated and invested in the overseas forestry development in 15 countries up to 1996. Their forest concession forest area is 4,084 thousand ha in 7 countries, and plywood production capacities is 597 thousand cubic metres per year. Sawn wood is 420 thousand cubic metres, and woodchip is 520 thousand cubic metres per year. They also planted the seedlings in 11.6 thousand ha. The total overseas forestry investment was $229.2 million up to 1995.

6.3 Korea's International and Regional Roles

Korea's role in global forestry can be broadly summarized in three categories:

i. Korea is famous for the artificial reforestation for timber and conservation in a short period, and it could be the model for the reforestation in the developing tropical countries. Korea has supported the developing countries by training of forest officials from developing countries, and also KOICA (Korea International Cooperation Agency) has dispatched forest experts to developing countries.

ii. Korea has imported a lot of timber (more than 90% of total demand) from abroad, and in 1970s and 1980s, exported a lot of plywood which manufactured from tropical logs imported from Asian countries.

iii. Korea will continue to import a lot of timber and timber products from abroad in the 21st century, and try to import the timber from sustainable forests.

Table 42. Overseas Forestry investment of Korean companies

Country	No. of companies	Year	Amount of Investment	Size by type			
				Forest concession	Forest industry	Chip	Plantation area
			1,000$	1,000 ha	1,000m^3/y	1,000 m^3/y	1,000 ha
Total 15	25	68-95	229,228	4,084	1,198.5	520	11.6
Indonesia	7	83-91	43,340	835	477.0	-	5.6
Malaysia	4	88-95	5,470	-	106.0	-	-
Solomon	1	81-92	32,500	365	16.0	-	0.4
P.N.G.	2	89	46,150	285	92.0	-	-
Fiji	1	91	600	17	7.2	-	-
Myanmar	1	91	4,034	-	22	-	-
U.S.A.	1	90-95	4,515	-	30	-	-
Russia	2	92	17,500	846	196	-	-
Guyana	1	92	3,600	1,670	193	-	-
Cambodia	1	93	1,965	-	24	-	-
Australia	1	93	17,853	-	-	-	2.3
Vietnam	2	93	6,239	-	13	294	1.7
Chile	1	94-95	1,900	-	24	-	-
China	2	95	2,695	-	4.3	120	-
Nicaragua	1		43,937	66	4	-	1.2

Source: Forestry Administration

6.4 International Environmental Initiatives

International Tropical Timber Organization (ITTO)

Korea became a member of the ITTO when ITTO was established in 1986. Korea is one of major consumer countries. At the 16th session of the Council Korea was elected as

Vice-chair for 1995 and to be Chairman in 1996 of Permanent Committee of Forestry Industry of ITTO.

International initiatives for sustainable management of forests

Korea is playing an active role in international working groups seeking to develop criteria and indicators for the sustainable management of the world's forests, especially the Montreal Process. Korea has been actively involved in the range of initiatives for which it is eligible including FAO's Ministerial meeting and COFO, Intergovernmental Panel on Forests. The 9th meeting of Montreal Process will be scheduled to open in Seoul.

Climate Change

Korea Government has participated the Framework Convention on Climate Change and has introduced a number of policy measures which are expected to limit CO_2.

Biological diversity

Korea has surveyed the biological diversity in Korean Peninsula, and participated in the Convention on Biological Diversity.

ANNEX 1: KOREA-GENERAL STATISTICS (FOR 1995)

Population	44,851 thousand
Density	451 per km^2
Growth Rate	0.90%
Language	Korean
Capital	Seoul
Monetary Unit	Korean Won
Exchange Rate	US$1 = 834 Won
Unemployment Rate	2.0%
Others	

	GDP	GNP	Per capita GNP US$	Economic Growth Rate %	No. of Employee 1,000p	Area of construction 1,000 m^2
1960	2.0	1.9	79	1.2	-	-
1970	8.1	8.1	253	8.8	9,617	10,787
1980	62.8	60.6	1,597	2.7	13,683	25,727
1990	253.6	251.8	5,883	9.5	18,085	116,419
1991	294.1	292.0	6,757	9.1	18,612	105,184
1992	307.9	305.7	7,007	5.1	18,961	94,647
1993	332.8	330.8	7,513	5.8	19,253	117,790
1994	380.7	378.0	8,508	8.6	19,837	116,221
1995p	455.6	451.7	10,076	9.0	20,377	117,327

ANNEX2: KOREA FOREST STATISTICS (FOR 1995)

Total Land Area	9,926,837 ha
Forest Area Total	6,451,885 ha
Stocked Forest Land	6,263,453 ha
Unstocked Forest Land	188,432 ha
Total Central Government Ownership	1,392,667 ha
Total Public Ownership	492,275 ha
Total Private Ownership	4,566,943 ha
Forest Growing Stock (Total)	308,825,576 m^3
Forest Stock per ha	47.87m^3

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List of Working Papers already printed

APFSOS/WP/01	Regional Study - The South Pacific
APFSOS/WP/02	Pacific Rim Demand and Supply Situation, Trends and Prospects: Implications for Forest Products Trade in the Asia-Pacific Region
APFSOS/WP/03	The Implications of the GATT Uruguay Round and other Trade Arrangements for the Asia-Pacific Forest Products Trade
APFSOS/WP/04	Status, Trends and Future Scenarios for Forest Conservation including Protected Areas in the Asia-Pacific Region
APFSOS/WP/05	In-Depth Country Study - New Zealand
APFSOS/WP/06	In-Depth Country Study - Republic of Korea